

Date: Friday, 21/11/2008 11:42:25 AM  
 User: Linda Lacelle

## Process Sheet

Customer	CU-DAR001 Dart Helicopters Services			Drawing Name	: 412 X-TUBE INST,LOW NARROW AFT		
Job Number	43687			Part Number	: D412664205DG		
Estimate Number	12817			Drawing Number	: D412-664 -245 REV C		
P.O. Number	:			Project Number	: N/A		
This Issue	21/11/2008	S.O. No.	:	Drawing Revision	: C		
First Rev	NC			Material	:		
Previous Run	1 / 41921			Due Date	: 05/12/2008 Qty: 1 Um: Each		
Written By							
Checked & Approved By							
Comment	Est Rev:A New Issue 07-04-05 JLM Est Rev:B 08-06-12 add comment in seq. 24 DD verified by:EC						

## Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
1.0	DC	DOCUMENT CONTROL  Comment: DOCUMENT CONTROL Photocopy bluefile and create labels as per PPP D412-664-205 CHG001
2.0	PACKAGING#1	PACKAGING RESOURCE #1  Comment: PACKAGING RESOURCE #1
3.0	D412664205TRN	Crosstube Turning Detail  Comment: Qty: 1.0000 Each(s)/Unit Total: 1.0000 Each(s) CROSSTUBE TURNING DETAIL batch: B42204
4.0	BENDING	BENDING MACHINE - SKIDTUBES  Comment: BENDING MACHINE Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010
5.0	QCIS	DIMENSIONAL CHECK  Comment: DIMENSIONAL CHECK

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No:                    PAR #:                    Fault Category:                    NCR: Yes No DQA:                    Date:                     
 Resolution:                    Disposition:                    QA: N/C Closed:                    Date:                   

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date &amp; initial all entries

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Job Number:



Seq. #:	Machine Or Operation:	Description:
6.0	D36061	Cuff
		Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s) CUFF Batch: B-31635
7.0	CROSSTUBES	CROSSTUBES RESOURCE 1
		Comment: LANDING GEAR RESOURCE 1  1-Drill Rivet holes as per Dwg D412-664-245 using DT8972.  2-Drill pilot holes in tube as per Dwg D412-664-245  3-Ream hole to finish size in tube as per Dwg D412-664-245  4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-245
8.0	HAND FINISHING1	HAND FINISHING RESOURCE #1
		Comment: HAND FINISHING RESOURCE #1 Chemical Conversion Coat Tube & Cuffs as per QSI 005 4.1.
9.0	QC3	INSPECT POWDER COAT/CHEMICAL CONVERSION
		Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION
10.0	QC5	INSPECT WORK TO CURRENT STEP
		Comment: INSPECT WORK TO CURRENT STEP
11.0	OUTSIDE SERV.11	OUTSIDE SERVICE -CROSSTUBES
		Comment: Sub-Contracting OUTSIDE SERVICES Liquid Penetrant Inspection as per QSI 038Or Issue P/O: 7725 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order

W/O:		WORK ORDER CHANGES							
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Machine Or Operation:

Description :

12.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

*1-812/01 C*

13.0

QC5

INSPECT WORK TO CURRENT STEP



*S 08 12 02*

Comment: Inspect for damage & ensure results are as per Dwg D412-664-203

14.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Rivet Cuffs as per Dwg D412-6647-245. with Sika flex in Between tube & Cuff

A/R SIKAFLEX -241/-291

BATCH: *M109883*

*Exp date - 9-2-1*

*8-12-2*

15.0

CR3212407

CHERRY RIVET



Comment: Qty.: 44.0000 Each(s)/Unit Total: 44.0000 Each(s)

CHERRY RIVET

Batch: *M104021*

*DP*

*8-12-2*

16.0

SPRAY PAINTING

SPRAY PAINTING



*(1X)*

*M104476*

*M-1 08/12/04*

Comment: SPRAY PAINTING

→ 1-Prime inside and outside crosstube as per QSI 005 4.2

*DASF Glasurit Drzb Green*

2-Paint outside crosstube with White Imron as per QSI 005 4.2

*M 08 12 03 (i)*

17.0

QC14

INSPECT SPRAY PAINT



*J 08 12 04 (i)*

Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

W/O:		WORK ORDER CHANGES					
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Job Number:



Seq. #:

Machine Or Operation:

Description :

18.0

D31891

Chafing Shield



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Chafing Shield

Batch: 41699x1 / 39736

ZT 08-12-04

19.0

D3595063570

RUBBER CUSHION



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Rubber Cushion

Batch: 37971

ZT 08-12-04

20.0

D28961

Support



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

PULL FROM STOCK 1 X D2896-1, BUFF LIGHTLY

REPAINT OLIVE DRAB GREEN B

M104476

*m/l 08/12/04*

Qty Part number Description Batch

1 D2896-1 Support 35577

*m/l 08/12/04 ①*

21.0

D2856600

Abrasion Strip



Comment: Qty.: 0.9450 f(s)/Unit Total : 0.9450 f(s)

Abrasion Strip

2 X D2856-600-1009

Batch: 36398

ZT 08-12-04

22.0

MS2192028

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28 Clamp 109181

ZT 08-12-04

23.0

MS2192030

clamp(per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

clamp(per MIL-DTL-8783C)

batch: 107545

ZT 08/02/04

## Dart Aerospace Ltd

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24.0 CROSSTUBES CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

Assemble as per Dwg D412-664-245

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install Chaffing Sheilds

3-Instal support with magnobond 6398 per dwg D412-664-245, using installaiton jig DT9024 with 0.010 thick brass shims on both chafing sheild (D3189-1).  
cure for 12hrs before packaging.

DT  
08-12-04

Time & date of application: 08/12/08

Batch: 108964

Torque: 11 08/12/08

25.0 QC5 INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

J 08/12/08 (x)

26.0 PACKAGING 1 PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

27.0 AN640A Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch: M108940

J 08/12/08 (x)

28.0 AN641A Bolt



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Bolt

Batch: M107613

J 08/12/08 (x)

## Dart Aerospace Ltd

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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_  
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Part Number: D412664205DG

Job Number:



Seq. #:	Machine Or Operation:	Description :
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29.0	MS21042L6	Nut
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Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)

Nut

Batch: M108183

AS 08/12/08 (XL)

30.0	AN960JD616	Washer
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Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)

Washer

Batch: M109371

AS 08/12/08 (XL)

31.0	QC4	INSPECT 100% KITS FOR COMPLETENESS
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Comment: INSPECT 100% KITS FOR COMPLETENESS

32.0	PACKAGING 1	PACKAGING RESOURCE #1
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Comment: HAND FINISHING RESOURCE #1

Identify and pack for shipping as per PPP D412-664-105

REV A 12/08/08 (1)

33.0	QC21	FINAL INSPECTION/W/O RELEASE
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Comment: FINAL INSPECTION/W/O RELEASE

08/12/08 (A)

Job Completion



MF 08-12-08

## Dart Aerospace Ltd

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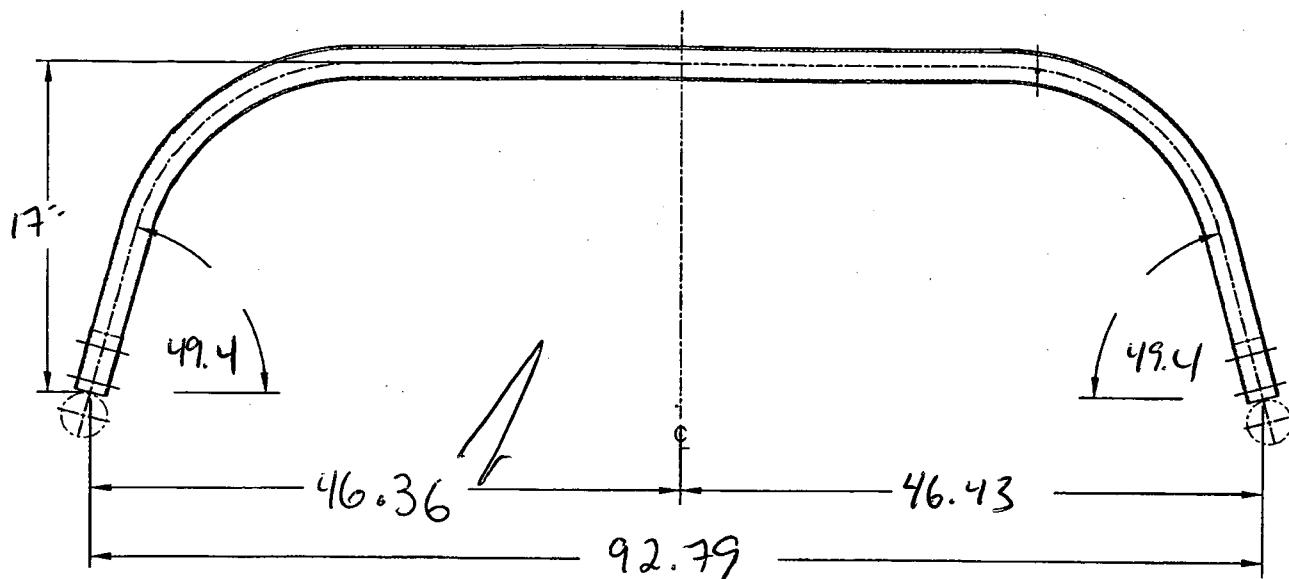
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DART AEROSPACE LTD	Work Order:	4368
Description: Crosstube Low Narrow Aft (412)	Part Number:	D412-664-205
Inspection Dwg: D412-664-245 Rev: C		Page 1 of 1

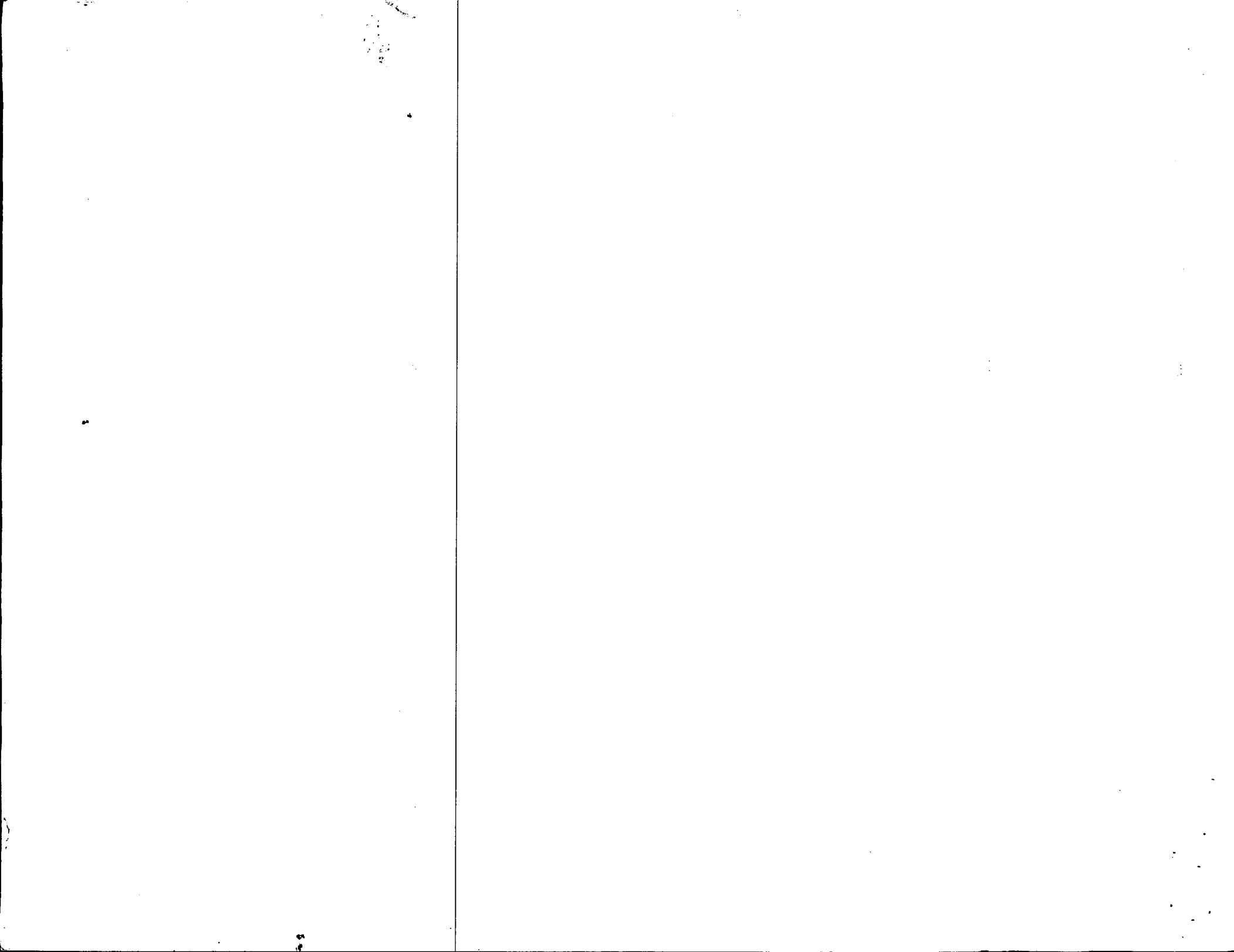
Required Dimension	Min	Max
Height	16.69	16.95
1/2 Span	46.47	46.73
Angle	49°	52°
Total Span	92.94	93.46



Comments

QC15 Inspection	6S1U12
Date	08/11/27

Rev	Date	Change	Revised by	Approved
A	07.04.27	New Issue	KJ/JM	JM



**DART**

DESIGN <i>QP</i>	DRAWN BY <i>QP</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[initials]</i>	APPROVED <i>[initials]</i>	DRAWING NO. D412-664-245	REV. C SHEET 1 OF 3
DATE 07.03.29		TITLE CROSSTUBE ASS'Y (412 LOW-N AFT) NTS	SCALE
A	06.12.01	NEW ISSUE	
B	07.03.01	CHG CUFF AREA, CHG RUBBER CUSHION	
C	07.03.29	CHG RIVET AND RUBBER CUSHION	

**RELEASED**07.04.24 *[initials]***PARTS LIST:**

Qty	Part Number	Description
X	D412-664-245	CROSSTUBE ASSEMBLY (412 LOW-NARROW AFT)
1	D6009-129	CROSSTUBE
2	D2856-600-1009	ABRASION STRIP
1	D2896-1	SUPPORT
2	D3189-1	CHAFING SHIELD
2	D3595-063-570	RUBBER CUSHION
2	D3606-1	CUFF
44	CR3212-4-07	RIVET (OR M7885/3-4-07)
4	MS21920-28	CLAMP
2	MS21920-30	CLAMP (OR MS21920-32)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

**GENERAL NOTES:**

1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.

2) MATERIAL: MANUFACTURED FROM D6009-129  
FINISHED LENGTH =  $123.59 \pm 0.020$  (BEFORE BENDING/TRIMMING)

3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART 005 4.2

4) PART IS SYMMETRIC ABOUT CENTERLINE.

5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.

6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.

7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.

9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF)-GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.

10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.

12) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.

13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

14) INSTALL D3606-1 CUDD AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUDD AND CROSSTUBE. SEAL EDGE OF CUDD TO ENSURE NO GAPS.

15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

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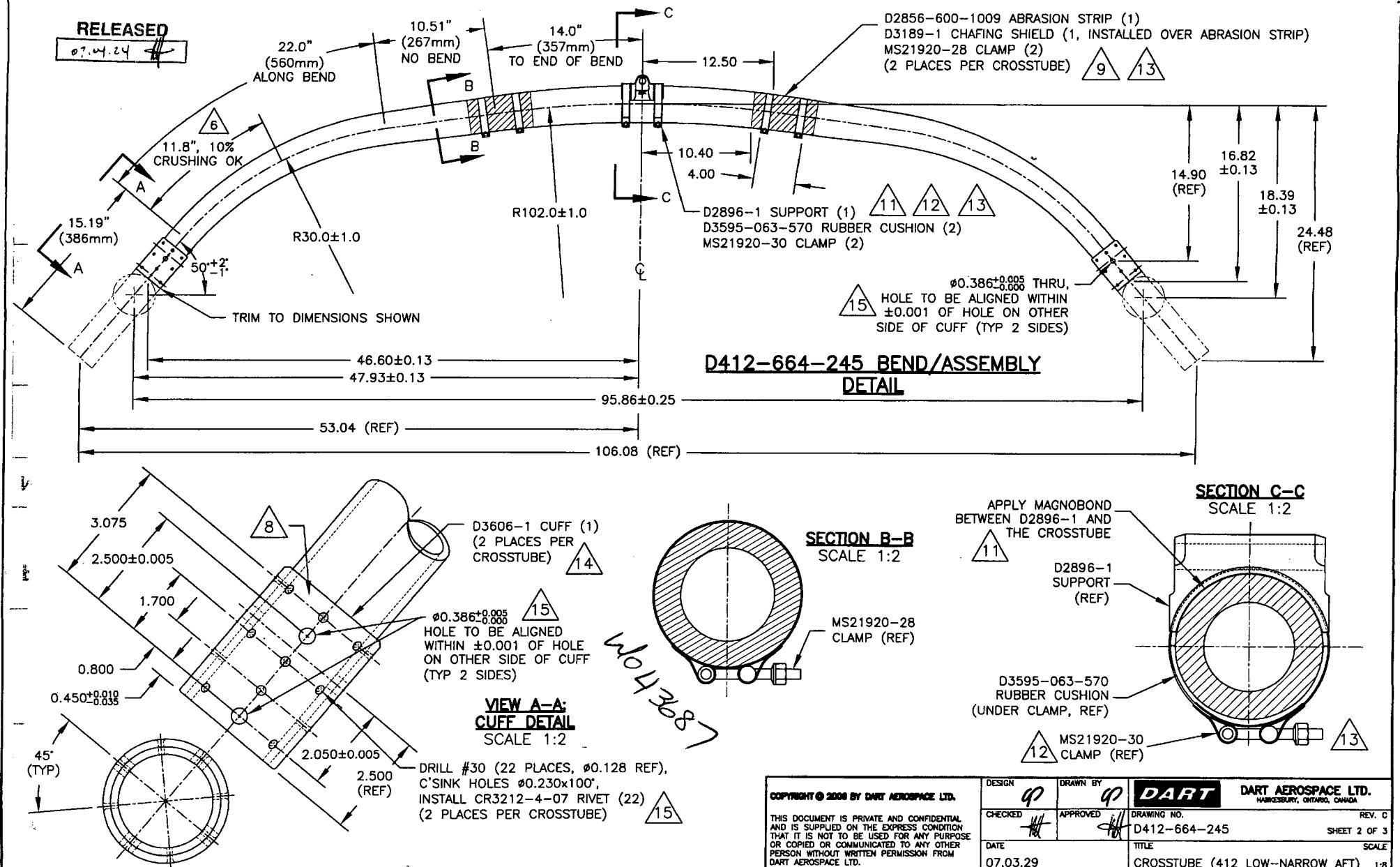
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RELEASED

07.04.24

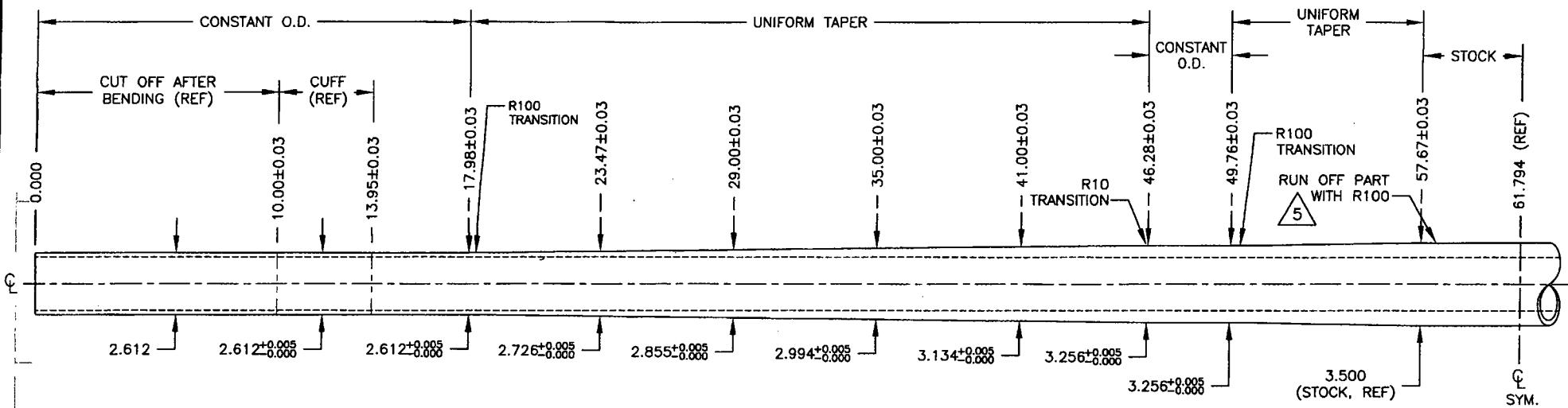


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D412-664-245 MACHINING DETAIL

RELEASED

07.04.19

M04368

DESIGN	DRAWN BY	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
CHECKED	APPROVED		DRAWING NO. D412-664-245 REV. C SHEET 3 OF 3
DATE	07.03.29	TITLE	CROSSTUBE (412 LOW-NARROW AFT) 14

W/O:		WORK ORDER CHANGES					
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## L Lacelle

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**From:** Bill Beckett [mailto:[bbeckett@dartaero.com](mailto:bbeckett@dartaero.com)]  
**Sent:** November 19, 2008 10:43 AM  
**To:** 'David Shepherd'  
**Cc:** 'L Lacelle'; [moreilly@eaglecopters.com](mailto:moreilly@eaglecopters.com); 'Peggy McDonald'  
**Subject:** RE: Canadian DND

David,  
Thanks for the help.  
Bill

---

**From:** David Shepherd [mailto:[dshepherd@dartaero.com](mailto:dshepherd@dartaero.com)]  
**Sent:** November 19, 2008 10:25 AM  
**To:** 'Bill Beckett'  
**Cc:** 'L Lacelle'; [moreilly@eaglecopters.com](mailto:moreilly@eaglecopters.com); 'Peggy McDonald'  
**Subject:** RE: Canadian DND

Bill,

I called Peggy on her cell phone this morning because we didn't get a response yesterday. She is travelling and having some email problems. Apparently, DND has requested Drab Green to distinguish the Dart gear from the OEM gear.

I have consulted the paint shop here at Eagle. They use a BASF Glasurit Paint system. This is the same type of paint we ended up using on the Glareshields. The brochure I am looking at shows a 754247 Olive Drab, but I'm not sure how well it matches the powder you are using on the skidtubes.

Suggest that you send me your "Drab Green" chip and we can do some comparisons here. If it doesn't quite match, the boys can play with the mixture here to try to get it to match. They can then give you the exact formula to order.

I talked to Linda about this and this seemed to make sense to her. Therefore, unless I hear differently, I am expecting an "Olive Green" paint chip to arrive at Eagle tomorrow.

David

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**From:** Bill Beckett [mailto:[bbeckett@dartaero.com](mailto:bbeckett@dartaero.com)]  
**Sent:** Wednesday, November 19, 2008 7:08 AM  
**To:** 'Peggy McDonald'  
**Cc:** 'L Lacelle'; 'David Shepherd'  
**Subject:** RE: Canadian DND

Peggy,  
The paint is becoming a pacing item. We need confirmation ASAP as to whether it will be Eagle Black or Drab Green.  
Please let us know.  
Thanks,  
Bill

---

**From:** David Shepherd [mailto:[dshepherd@dartaero.com](mailto:dshepherd@dartaero.com)]

W/O:

## WORK ORDER CHANGES

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# LIQUID PENETRANT TEST REPORT

P- 09132

PAGE 1 OF 1

CLIENT	Dart Aerospace	DATE	Dec 1, 2008	TIME	AM <input type="checkbox"/>	PM <input checked="" type="checkbox"/>
ATTENTION	Linda Lacelle	ACUREN JOB NO.	188-08-1599			
ADDRESS	1270 Aberdeen St.	PO/MO NO.	7725			
	Hawkesbury, Ont., K6A 1K7	WORK LOCATION	Hawkesbury			
PROJECT	ACCEPTANCE STD. ASRM 1417 / QSI-03, REV./DATE 2005					
ITEM(S) EXAMINED	X-TUBE 5084; 43473, 43474, 43476, 43493, 43686 (43687) RGL AFT X-TUBE (412 X-TUBE) INST, LOW NARROW FWD, (412 X-TUBE) INST, LOW NARROW (AFT)					

JOB DESCRIPTION	PROCEDURE NO. LT- <del>000</del> REV./DATE	TECHNIQUE NO. LT- <del>000</del> REV./DATE
ART NO. D20667203BL, D412664/05 DG, D612664 <sup>285DG</sup>	MATERIAL ALODINE ALUM. THICKNESS	
SCOPE WET FLUORESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100%	EXTERNAL SURFACE	

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**TEST DETAILS**

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	MAGNAFLUX		BLACK LIGHT S/N	8171	OUTPUT > 1000 μW/CM <sup>2</sup>
ENTRANT	MINIMUM DWELL TIME	30 MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT	<input type="checkbox"/> TROUBLELIGHT
ENTRANT REMOVER	H <sub>2</sub> O	MINIMUM DRY TIME	>10 MIN.	OTHER	OUTPUT > 100 fc @ SURFACE
DEVELOPER	SKDS 2	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	CAL DUE DATE
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY		

## **TEST SURFACE**

AS GROUND       AS WELDED       MACHINED       SHOT BLASTED       CLEAN BARE METAL

< -4°C/20°F       -4°C/20°F TO 10°C/50°F       10°C/50°F TO 52°C/125°F       > 52°C/125°F

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## **RESULTS-**

### **Scope of Services**

*The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the last or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.*

*n performing the serv*

<b>SIGNATURES</b>			
CLIENT REPRESENTATIVE	<u>Mélanie Fautoux</u>	<u>M. Fautoux</u>	DTR #
TECHNICIAN (SIGNATURE):	<u>Frédéric Chagnon</u>		REPORT REVIEWED BY:
NAME (PRINT):	1 <sup>ST</sup> TECHNICIAN CGSB LEVEL <u>II</u> SNT LEVEL <u>II</u>		NAME INITIALS
	CGSB LEVEL <u>CGSB REG. NO.</u> SNT LEVEL <u>10560</u>		INITIALS
	CGSB LEVEL <u>CGSB REG. NO.</u>		

